Jordan Nguyen
COGSCI150
8 May 2023
Final Case Study

Choral Ensembles: How Many Voices Blend to Become One

Overview.
Choral ensembles, choruses, or choirs are groups of people who sing together to make music – often varying broadly in their ability level, the type of repertoire they perform, and their mix of genders. In many choirs, especially ones that perform classical music, one of the main goals is "blending" voices together in order to create one cohesive sound for the audience. This introduces an interesting question of granularity – is a choir to be thought of as "one" or as many voices working harmoniously to generate the "one" voice that the audience perceives? I believe this answer is a matter of perspective. From the audience's perspective, the choir is meant to be perceived as "one" voice, where no single voice or person stands out. From the conductor's perspective, the choir must be considered as many different voices so that the conductor can properly guide the singers of the choir towards making one sound. This goal of "oneness" ultimately drives choral ensembles as organizing systems.

What is being organized?
The main resources of the choir organizing system are singers (people). The scope of these resources varies greatly depending on the type of choir, but people of all genders and musical abilities can be members of a choir. Some choirs are made up of all men, some are made up of all women, and some are a mix. The mixed choir, commonly known as an SATB (Soprano, Alto, Tenor, Bass) choir, will be the main focus of this case study. One constraint on the scope of resources is a skill involving a "musical ear": people in choirs must have a "musical ear" in order to be able to hear the pitch they must produce and to hear the pitches of those around them. Some people are "tone-deaf," and this can introduce many complications in a choir because it can create a lack of consensus on which note must be sung. The scale of the choirs also depends on the type of choir, but often the size of a choir can range from about 30 people to even hundreds of people.

In terms of the level of abstraction, on a pragmatic level, singers within the choir are considered to be unique instances – in most cases, one singer is not interchangeable with another singer of the same voice part. However, on an ideal level, the overarching goal of the choir as a whole is for each singer to be so well blended with the group that an illusion of interchangeability is created. This would imply that no singer stands out or is unique, and all singers within a voice part can be considered interchangeable.

Finally, since the resources of this organizing system are people, there is certainly a lifecycle associated with them. As singers become more experienced with singing and reading music, singers can become more advanced in their vocal ability – thereby allowing them to join a more advanced choir if they wish. Additionally, each singer goes through changes in their voice as they age; for example, many young boys' voices deepen to reach lower notes and their voice part

might change. As I first learned from Professor Glushko, the "castrati" singers of the 16th century were called that because of the castration young boys underwent to prevent their voices from deepening. However, for obvious reasons related to this being very inhumane, this practice of trying to alter the natural lifecycle of these singers as resources is no longer in use.

Why it is being organized?

Choirs are organized in order to optimize interactions between the choir and the audience, the choir and the conductor, and the interactions among members of the choir. For the choir and the audience, this often looks like "giving it your all" through the choir performing as best they can and the audience's enthusiasm in applause. For the choir and the conductor, these interactions are primarily listening-based. The conductor must be able to hear all of the moving parts of the music, and the choir must be able to watch the conductor so they can adjust their performance in order to create a better balance. For the members of the choir, these interactions are often also listening-based in the sense that people across voice parts need to be able to hear each other to stay in tune, to stay on beat, and to know when they need to come in to sing their part. Figure 1 below shows a bit of these interactions.

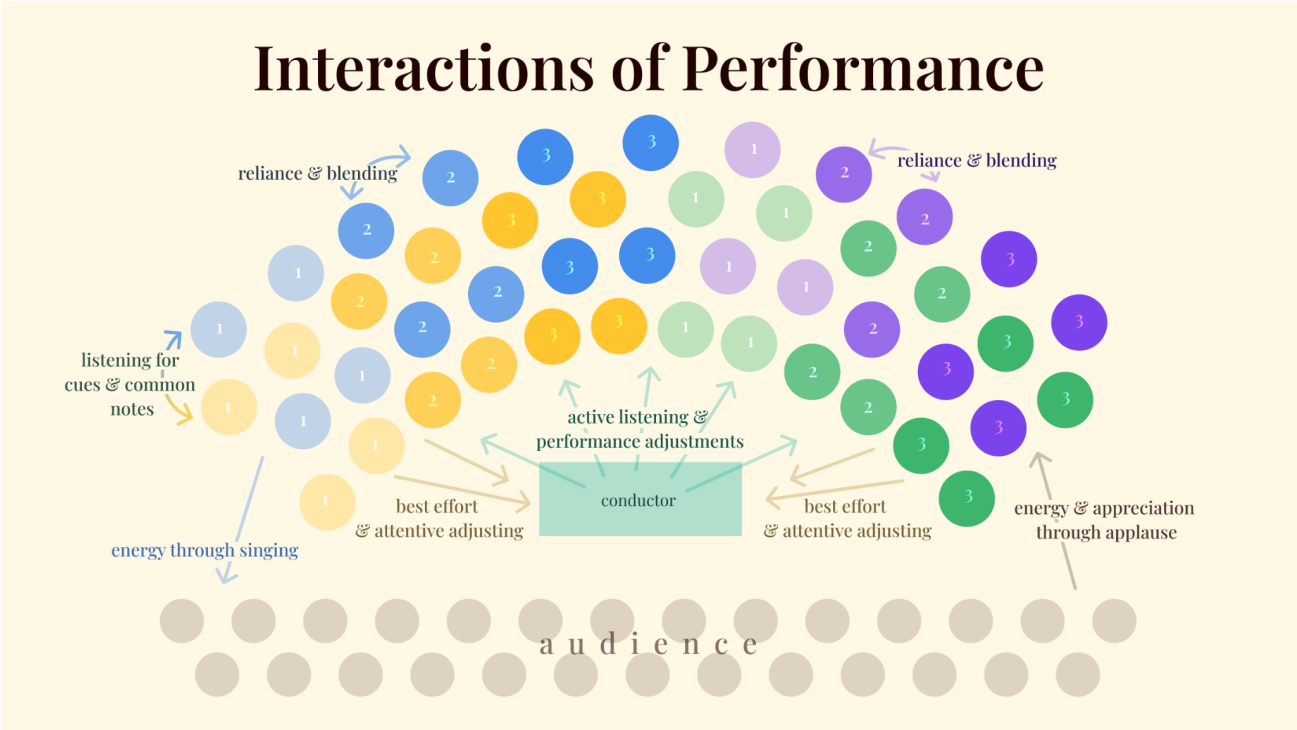

Figure 1. "Interactions of Performance," with arrows that label different interactions that occur between the choir & the conductor, the choir and the audience, and the among choir members.

The interactions between the choir and the audience are quite energy-based. For the audience, as they listen to the choir and are able to (hopefully) enjoy the music the choir is producing, they are emotionally moved in some way by the music. Additionally, they are experiencing the energy the choir is outputting through the energy the singers put into their performance. For the choir, when the audience applauds after a piece of music, they are able to feel the gratitude and awe from the audience, further fueling them to create more emotional & energetic output in the songs to follow. In this sense, these are interactions that go both ways.

The interactions between the choir and the conductor are based in listening to the music. For the conductor, this involves carefully looking at the entire score of music to know which part needs to be cued to come in and how to adjust the choir's volume. For the choir, this involves making sure to always have the conductor in their line of sight to ensure they are following along the central authority of the choir. This also involves being attentive to the conductor's instructions as they signal to the choir how to change their performance. The conductor signals to the voice parts individually for cues of when to come in or to tell them to tune their sound, as well as to the choir as a whole by keeping time and changing the dynamics.

Finally, the interactions between members of the choir are very idiosyncratic. Between members of the same voice part who are singing the same line, this can be a process of blending voices together to make sure they sound like one voice. This can also be a process of relying on one another to hit notes that might not be in the most comfortable part of another's voice or relying on one another to know the music a bit better.

How is it being organized?

The main, overarching organizing principle that guides the choir as an organizing system is creating an acoustic balance across all of the different moving parts in the piece of music being performed. However, there are also many different processes of organizing at different levels within the architecture of the choir.

The first of these processes of organizing begins with the selection of resources, which is called auditioning in the choral domain. For example, UC Berkeley's Music Department offers auditions for the University Chorus, University Chamber Chorus, and Golden Bear Voices (as well as a few vocal technique classes) every semester. In these auditions, singers prepare a piece of classical music to showcase their voices. Then, the conductor will check their vocal range to see which notes they are capable of producing. Finally, the conductor will ask the singer to look at a piece of music they've never seen before and attempt to "sight-sing" it (where they will try their best to sing the notes in the music based on their training with intervals and relative pitches). All of these processes within the audition process are data points for the conductor in the organizing that follows.

At the top level of organizing, the organizing principle of singer ability is used to assign singers to a performance group. The singer's ability is usually determined by how well their performance of their chosen audition song went, as well as their proficiency in sight-singing and their sense of intonation (ability to accurately hit the pitch). A singer with a higher ability will get placed in a more advanced choir, often a "chamber choir" of some sort (e.g. UC Berkeley University Chamber Chorus), while a singer with a still developing ability will get placed in a simpler choir (e.g. UC Berkeley University Chorus). The caliber of the choir itself is determined by the difficulty of the pieces of music that the choir sings. Figure 2 below shows a visualization of the spectrum of relative ease and difficulty of choral arrangements.

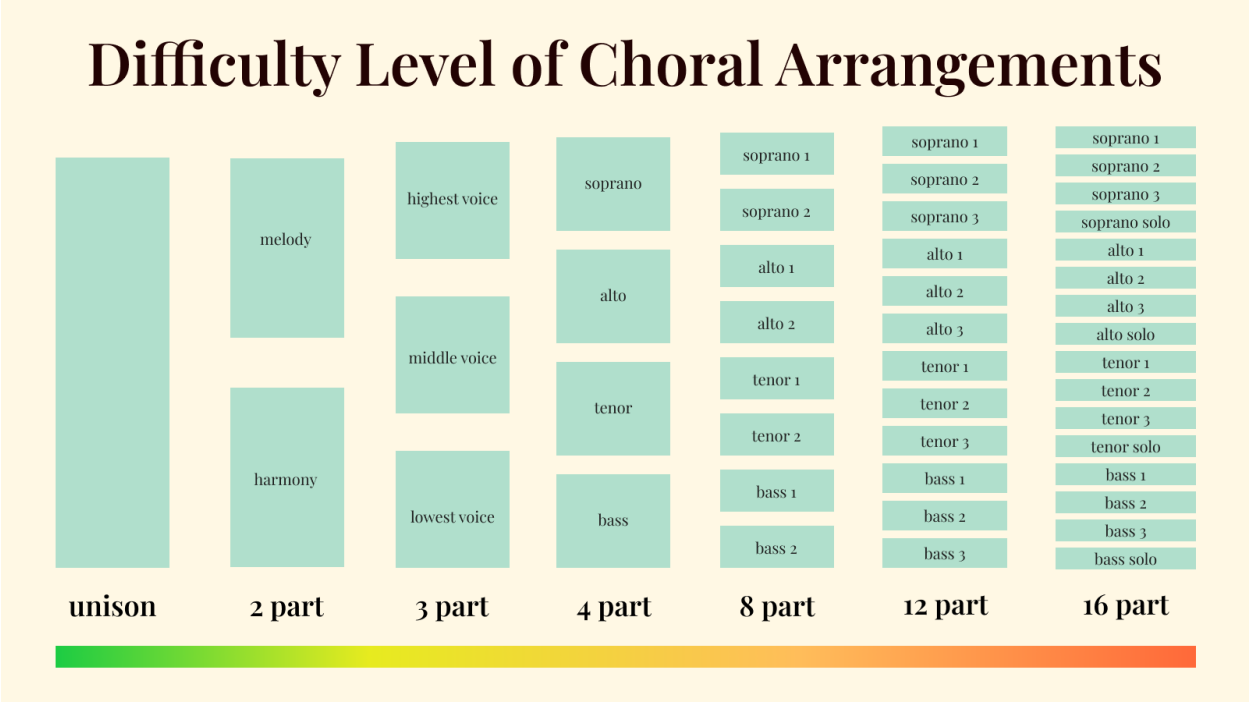

Figure 2. "Difficulty Level of Choral Arrangements," as determined by the amount of different moving parts within the piece. The colored gradient spectrum at the bottom is meant to illustrate the increasing difficulty.

At the mid-level of organizing, the conductor will decide, based on their assessment of the singer's vocal range, how the singer should be classified in terms of voice part. This assessment is often done with respect to the singer's tessitura, which is the part of their voice where they are most comfortable singing. In that sense, the organizing principle in play is the comfort & ability level of the singer. Figure 3 below provides a visualization of the way the voice parts are split up.

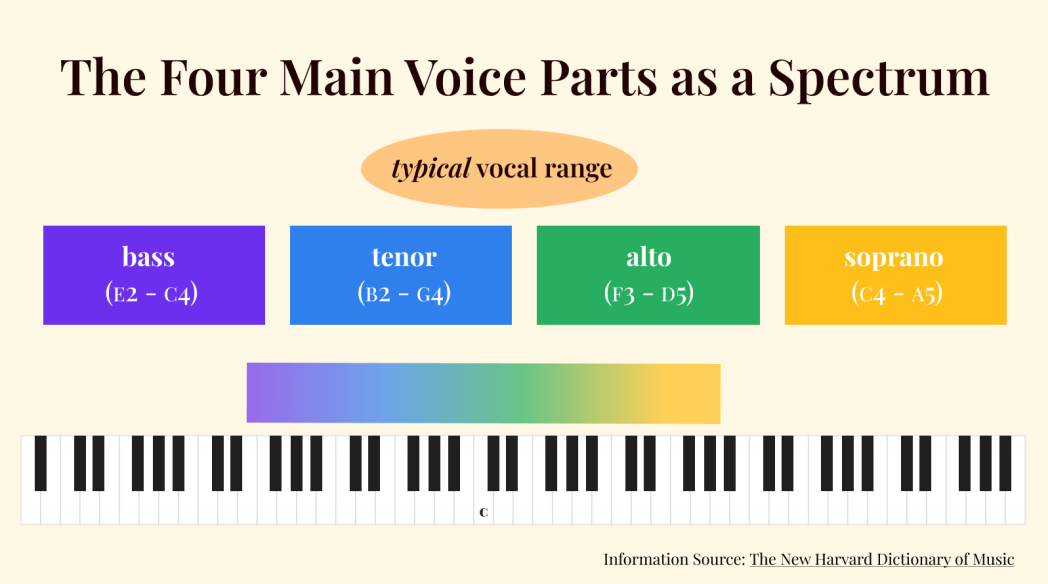

Figure 3. "The Four Main Voice Parts as a Spectrum," as depicted with the 7 octaves of a piano in order illustrates the range of notes a choir can cover. Of note, many singers can sing beyond these fixed boundaries, so the ranges are more of a guide than a strict rule.

However, there are also constraints and path dependence involved in this assessment. Sometimes, a singer's tessitura will be in a certain voice part but the needs of the choir will dictate that they should be placed in a different voice part they would have the ability to perform. One example of this is often with "lady tenors" – women whose tessitura is in the Alto 2 range, but who have been placed as a Tenor 1 in order to increase the number of tenors. These women often have a strong lower range and are able to assist the tenor section. This also involves path dependence because the current members of the choir dictate the needs that the conductor is searching for in the audition process.

Finally, the lowest level of organizing is through voicing, which happens once the choir has come together after auditions. This process is very idiosyncratic to their conductor. It involves looking at each section of the choir and individually considering each singer for their ability, vocal color, and sense of intonation. During the voicing process, the conductor will rearrange singers into a formation where the vocal colors of the singers complement each other such that no singer stands out. Additionally, the conductor does this to ensure that the whole group has a good sense of intonation. If someone tends to fall flat while singing, the conductor will purposely place them near people who are always "on pitch" in order to solidify the sound and to achieve good intonation across the board. Overall, this process is very specific to the singers within the choir and to the preferences of the conductor. However, interestingly, it is the most granular form of organizing within the choir, and it can make or break the sound the choir creates.

When is it being organized?

The organizing process in choirs takes place at multiple points over the course of a singer's journey in the choir. First, it begins with the auditioning process in which singers are classified into the voice part that they will sing within the choir. This classification happens as the conductor evaluates the singer in their audition, and is made official when the singer is notified of their assigned voice part.

Second, organizing the choir as an ensemble comes when all of the singers rehearse together for the first time. In this period, the conductor is able to get their first insight into how the choir can perform together as "one." During the first few rehearsals, often in smaller choirs where the scale is more manageable, the conductor will voice each section of the choir in order to create the best sound for that particular voice part.

Finally, organizing the choir to fit the song that is being performed occurs as the performance grows near. This organizing process is done once the choir has gotten acclimated to singing with one another, and once the choir has become familiar with the music. The placement of singers in each voice part often depends on the confidence that each singer in the choir has with respect to the music they're singing. Figure 4 below shows an example of various macro choir voicings that reflect the ability level and overall distribution of singers within each voice part. For example, in the UC Berkeley University Chorus, there are far more Sopranos & Altos than Tenors & Basses, so it's more effective to place the Tenors & Basses in the center to break up the block of higher voices (Sopranos & Altos). By contrast, the UC Berkeley Chamber Chorus placement pictured in the bottom left shows a lot of intermingling of the different voice parts. This mixed formation is enabled by the strong ability of each singer within the choir.

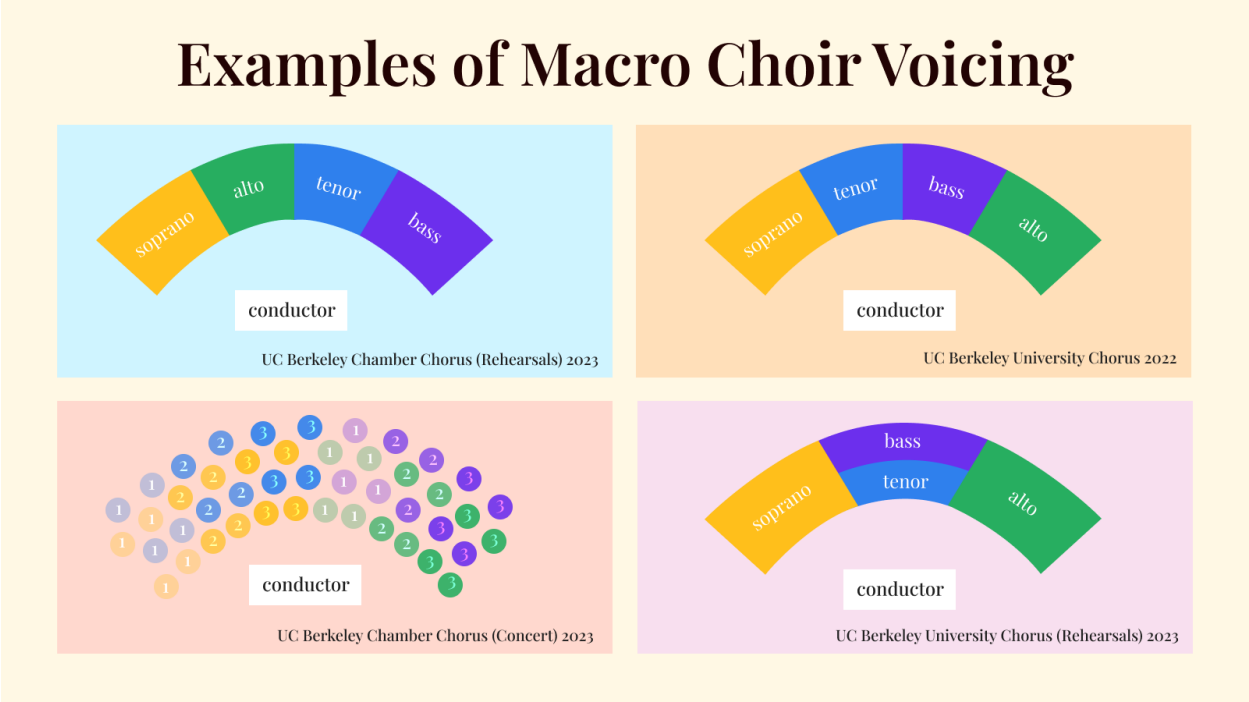

Figure 4. "Examples of Macro Choir Voicing," as taken from the experience of UC Berkeley choirs. Each physical arrangement of singers is reflective of the distribution of singers across the voice parts.

Who is organizing it?

The main organizer of the choir is the conductor, who often does this along with the support of the assistant conductor. The conductor is often very experienced with music and uses their expertise to guide how they organize the choir. Additionally, each conductor has their own preferences and idiosyncrasies, leading to a physical arrangement of singers that reflect those.

Singers within the choir do have a bit of input in the way the choir is organized by expressing their preferences when it comes to the way they are placed. For example, if a certain physical arrangement on the stage makes everyone feel a bit uneasy about singing their part because they feel too separated from similar voice parts, singers can express this to the conductor so that their input can be taken into account. Often, the conductor will seriously consider the singers' input so that they can produce the best sound.

Where is it being organized?

During rehearsals, the choir is organized to fit that physical space. Sometimes choirs end up performing in the same space that they rehearse in, so that is one less re-organization process to worry about. However, often choirs are performing in different locations than the one they rehearse in, leading to a need for re-organizing to accommodate the new constraints of the space.

Other Considerations

One interesting comparison can be made between choirs and orchestras. In both cases, the main organizing principle is acoustic balance. However, one important difference is that in a choir, singers' bodies are their instruments as opposed to the physical instruments that orchestra members use. In this sense, being in a physical position where the singer can correctly sing the note that they're supposed to can truly make or break the choir's performance, as they have to be more reliant on those around them to understand when they're supposed to begin singing and what note to sing.

References

1. A Conversation with Dr. Wei Cheng & Jennifer Liu – Conductor and Assistant Conductor of the UC Berkeley University Chorus and UC Berkeley University Chamber Chorus

2. Case Western Reserve University. (n.d.). *Castrato Voice (Baroque)* . Early Music Instrument Database. Retrieved May 7, 2023, from https://caslabs.case.edu/medren/baroque-instruments/castrato-voice-baroque/

3. Yale. (n.d.). *Vocal ranges according to The New Harvard Dictionary of Music*. Vocal Ranges | Yale University Library. Retrieved May 7, 2023, from https://web.library.yale.edu/cataloging/music/vocal-ranges